

REMARKS

I. Status of the Application

Claims 1-14 and 21-24 are pending in this application. In the May 5, 2004 Office Action, the Examiner:

- A. Rejected claims 1, 2, 8, 10, 22 and 24 under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent 4,311,671 to Notman (hereinafter, "Notman").
- B. Rejected claims 3-6, 21 and 23 under 35 U.S.C. §103(a) as allegedly being unpatentable over Notman.
- C. Rejected claims 7 and 11 under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent 5,137,701 to Mundt (hereinafter, "Mundt") in view of Notman.
- D. Rejected claim 9 under 35 U.S.C. §103(a) as allegedly being unpatentable over Notman in view of U.S. Patent 5,384,051 to McGinness (hereinafter, "McGinness").
- E. Rejected claims 12-14 under 35 U.S.C. §103(a) as allegedly being unpatentable over Mundt in view of Notman and McGinness.

In this Response, Applicants respectfully traverse the foregoing rejections and respectfully request allowance of all claims in view of the following.

II. The Present Invention

The present invention is a process effluent abatement arrangement that includes an enclosure, a first partition, a gas connector, a gas dispenser and an exit port. The enclosure defines an interior void. A first partition has a first orifice defined therein and

is positioned within said interior void such that (i) the first partition divides the interior void into a first chamber and a second chamber and (ii) the first orifice is in fluid communication with said first chamber and said second chamber.

Referring to Fig. 1 by way of a non-limiting example, a partition 16 divides the void 14 into a first chamber 40 and a second chamber 42. In the exemplary embodiment, the second chamber 42 has a number of sub-chambers 44, 46, etc. The partition 16 includes an orifice 18 that is in fluid communication with the first chamber 40 and the second chamber 42.

The gas connector has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with the passageway. The passageway has an inlet and an outlet and is in direct fluid communication with said first chamber of the enclosure. Again with reference to the non-limiting example of Fig. 1, a gas connector 68 has (i) a passageway 70 defined therethrough and (ii) a gas port 72 in fluid communication with the passageway 70. The passageway 70 includes an inlet 74 and an outlet 76. The gas port 72 is disposed downstream of said inlet 74 and upstream of said outlet 76.

The gas dispenser is in direct fluid communication with the second chamber of the enclosure. The exit port is in fluid communication with said interior void. In the exemplary embodiment of Fig. 1, a gas dispenser 78 is in direct fluid communication with the sub-chamber 48 of the second chamber 42. An exit port 80 is in fluid communication with the void 14.

In one form, the second chamber has a second partition having an orifice therein. The orifices of the first partition and second partition have central axes that are offset

from one another. In another form, the first orifice of the first partition is aligned with the longitudinal axis of the enclosure.

III. The Prior Art Rejection of Claims 1, 2, 8, 10, 22 and 24 Should be Withdrawn

In the Office Action dated May 5, 2004, the Examiner rejected claims 1, 2, 8, 10, 22 and 24 under 35 U.S.C. Section 103(a) as allegedly being unpatentable over Notman.

A. Notman

Notman is directed to a reactor for catalytic gas reactions. The reactor includes an outer vessel (10) that contains three small catalyst beds 12A, 12B and 12C, and a large catalyst bed (14). Each small bed is bounded on its underside by a grid 16A, 16B and 16C (see Notman, column 6, lines 59-64 and Fig.1). Above catalyst bed 12A there is a sparger 30 adjacent feed holes 32 through which gas enters from main feed 34 via the cold side of heater exchanger 40 (see Notman, column 7, lines 9-12 and Fig. 1). Tube 26 supports at its upper end part of the weight of heat exchanger 40. Within tube 26 is disposed inner axial tube 42, such that the annular space between tubes 42 and 26 constitutes the inlet to the tubes of heat exchanger 40. The tubes of heat exchanger 40 are disposed in an annulus about inner axial tube 42; they discharge into plenum 44 and thus via inner tube 42 to distributor 46 at the inlet of large catalyst bed 14 (see Notman, column 7, lines 32-39 and Fig. 1).

B. Claim 1

Claim 1 stands rejected as allegedly being unpatentable over Notman. Claim 1

includes the following limitations:

a gas connector which has (i) a passageway defined therethrough and (ii) a gas port in fluid communication with said passageway, said passageway (A) having an inlet and an outlet and (B) being in direct fluid communication with said first chamber of said enclosure, said gas port being downstream of said inlet and upstream of said outlet;

Thus, a gas connector has a passageway with and inlet and an outlet. The gas connector also includes a gas port in fluid communication with the passageway, downstream of the inlet and upstream of the outlet.

1. Notman Does Not Teach a Gas Connector and Gas Port as Claimed

Notman does not teach, suggest and/or disclose all of the elements of claim 1. In particular, Notman does not teach, suggest and/or disclose a gas connector having a passageway defined through the gas connector and a gas port in fluid communication with the passageway, the passageway having an inlet and an outlet, the gas port being downstream of the gas connector inlet and upstream of the gas connector outlet.

The Examiner has alleged in the 5/5/04 Office Action, page 3, that the main feed 34 of Notman constitutes the gas connector of claim 1 (see, for example, gas connector 68 of Applicant's Fig 1), that the feed holes 32 of Notman constitute the gas connector outlet of claim 1 (see, for example, gas connector outlet 76 of Applicant's Fig. 1), and that the sparger 30 of Notman constitutes the gas port of claim 1 (see, for example, gas port 72 of Applicant's Fig. 1). Particularly, on page 3, heading "iii", of the 5/5/04 Office Action, the Examiner alleges that Notman has:

"A gas connector (conduit 34) which has:

- a. A passageway (34) defined there through and
- b. A gas port (30) in fluid communication with the passageway and supplied by a gas source (see arrow entering 30; column 7, lines 1-10), the passageway having an inlet (34) and an outlet (32) and being in direct fluid communication with the

- first chamber (12A) of the enclosure
- c. The gas source is advanced into the passageway (34) of the gas connector (conduit 34) via conduit 26
 - d. The gas port (30) being downstream of the gas connector inlet (34) and downstream of the gas connector outlet (32)."

Applicants respectfully disagree with the Examiner's characterization and/or reading of Notman. Referring to Fig. 1 of Notman and the accompanying text found in columns 6 and 7 thereof, Notman does indeed have a gas connector or conduit (main feed 34) having a passageway (unlabeled) therein. The gas connector (34) has an inlet (unlabeled, but at the upper end of the main feed 34) and an outlet (feed holes 32) through which gas enters from the main feed (34) via the cold side of the heat exchanger (40).

However, contrary to the Examiner's statement that Notman has "a gas port (30) in fluid communication with the passageway (conduit 34) and supplied by a gas source" the gas connector (34) of Notman *does not* have a gas port in passageway (conduit 34) as is recited in Applicant's claim 1. The sparger (30) of Notman is a *separate* tube that surrounds a neck portion of the tube (26) below the heat exchanger (40) and below the feed holes (32). The separate nature of the Notman sparger (30), in addition to its clear depiction as such in Fig. 1 of Notman, is further borne out by the definition of a sparger. Particularly a perforated-pipe distributor, other wise known as a sparger, is: "a liquid distribution device consisting of a length of piping or tubing with holes at spaced intervals along the length; used in spray columns, liquid-vapor contactors, and spray driers" (see McGraw-Hill Dictionary of Engineering, second edition, 2003). Since the sparger (30) is a separate tube, it is clear that the Notman gas connector (34) does not have a gas port in fluid communication with a passageway of a gas connector as recited

in Applicant's claim 1.

This makes the Examiner's statement that "Notman does not teach a gas connector having a gas port that is downstream of its inlet and upstream of its outlet" (see 5/5/04 Office Action, page 4, last paragraph) particularly true. Since Notman does not teach a gas port in the gas connector, Notman certainly cannot teach a gas connector having a gas port that is in fluid communication with a passageway of the gas connector and being downstream of its inlet and upstream of its outlet. It certainly would not have been obvious in view of Notman to provide a gas port above the gas outlet as alleged by the Examiner.

While the Examiner indicates that Notman does not teach a gas port that is upstream of its outlet, the Examiner alleges "[I]t would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the length of Alan Notman's gas connector (conduit 34) such that his gas port (30) is upstream of the gas connector outlet (32)." The Examiner further alleges that "[M]otivation to optimize the length of Alan Notman's gas connector (conduit 34) such that his gas port (30) is upstream of the gas connector outlet (32) is to optimize gas mixing in Alan Notman's first chamber (12A) as taught by Alan Notman (column 1, lines 25-38; column 2, lines 9-15)." Applicants respectfully disagree, first because Notman does not teach or suggest a gas port in a gas connector and second because there is not suggestion or motivation in Notman to make such a modification even assuming that Notman taught a gas port in a gas connector that was downstream of the gas connector inlet.

Assuming that Notman teaches a gas port in a gas connector that is in fluid communication with a passageway of the gas connector and being downstream of the gas

connector outlet, Applicants submit that it would not have been obvious to provide the gas port above the gas outlet since the gas inlet/outlet of Notman work in conjunction with the heat exchanger 40 of Notman (i.e. has a thermal relationship therewith). Thus, in Notman the outgoing gas from the feed holes 32 is in a thermal relationship with the gas coming from the below the catalyst bed 12C and thus grid 16C as carried via passageway formed between the inner tube 42 and the outer tube 26 and flowing into the heat exchanger 40. Such a thermal relationship would be lost if the sparger gas were introduced into the incoming gas (via conduit 34) of Notman.

For the foregoing reasons, it is respectfully submitted that the Examiner has failed to set forth a *prima facie* case of obviousness with respect to claim 1 since Notman fails to disclose or suggest each and every element of claim 1. As a consequence, the obviousness rejection of claim 1 is in error and should be reversed.

C. Claims 2, 8 and 10

Claims 2, 8 and 10 also stand rejected as allegedly being unpatentable over Notman. Claims 2, 8 and 10 all depend from and incorporate all of the limitations of claim 1. Accordingly, for at least the same reasons as those set forth above in connection with claim 1, it is respectfully submitted that claims 2, 8 and 10 are patentable over the prior art.

D. Claim 22

While claim 22 contains some limitations that are similar to those of claim 1, claim 22 does not include a limitation directed to the location of a gas port upstream of

the gas outlet and downstream of the gas inlet. Accordingly, not all of the arguments provided above in connection with claim 1 apply to claim 22.

Claim 22, nevertheless, includes the following limitations:

a first partition having a first orifice defined therein, said first partition being positioned within said interior void such that (i) said first partition divides said interior void into a first chamber and a second chamber and (ii) said first orifice is in fluid communication with said first chamber and said second chamber

....

said first orifice has a first central axis that is substantially aligned with the longitudinal axis of the enclosure;

Thus, the orifice in the first partition is centrally located, or “aligned with the longitudinal axis” of the enclosure.

1. The Rejection of Claim 22 is in Error

Notman does not disclose a first orifice as recited in claim 22. In the 5/5/04 Office Action, the Examiner alleged that the grid 16a of Notman constitutes a first partition as claimed and that it has a first orifice (“central hole”) that constitutes the first orifice (5/5/05 Office Action, page 3). This central hole is the opening through which the tubes 26 and 42 pass. (see Notman, Fig. 1). That central hole, however, does *not* satisfy the limitations of the first orifice as recited in claim 22.

In particular, the central hole in the grid 16a of Notman is *not* in fluid communication with first and second chambers, as called for in claim 22. To this end, it is noted that the Examiner alleged that the catalyst beds 12a and 12b of Notman constitute the claimed first and second chambers. (5/5/04 Office Action at p.3). The central hole of the grid 16a is *not in communication with* those catalyst beds 12a and 12b. The central hole is provided to allow the tubes 26 and 42 to pass. (See Notman, Fig. 1).

While gas passes through the tubes 26 and 42, the tubes 26 and 42 do *not* have openings into either of the catalyst beds 12a and 12b. The tubes 26 and 42 extend from the large catalyst bed 14 to the heat exchanger 40.

The Examiner nevertheless maintains that gas does pass between the catalyst beds 12a and 12b through the central opening. In particular, the Examiner alleged that the “first orifice has a first central axis (collinear to central axis of 42) and being aligned (colinear) with the longitudinal axis of the enclosure, the first central axis is further *unobstructed* such that gas can pass (see flow arrows) from the first chamber to the second chamber through the first central axis.” (5/5/04 Office Action at p.4) (emphasis added). In other words, the Examiner appears to be alleging that gas may freely pass from the chamber 12a to the chamber 12b through the tubes 26 and 42. It is respectfully submitted that the Examiner has mischaracterized the nature of the tubes 26 and 42. Those tubes do *not* allow gas to flow from the first chamber 12a to the second chamber 12b. Gas may pass between the two chambers 12a and 12b through the off-center opening 36a, but not through the tubes 26 and 42 in the central axis of the device.

Accordingly, Notman fails to teach or suggest a first orifice in communication with the first and second chambers, and which has a central axes aligned with a longitudinal axis of the enclosure as claimed. Because of Notman’s structure, it is not conceivable how Notman can suggest the structure the Examiner is contending that Notman suggests. Such a structure would be nonfunctional. For at least this reason, it is respectfully submitted that the Examiner has failed to set forth a *prima facie* case of obviousness with respect to claim 22 and thus the rejection of claim 22 as allegedly being obvious over Notman is in error and should be withdrawn.

E. Claim 24

Claim 24 also stands rejected as allegedly being obvious over Notman. Claim 24 depends from and incorporates all of the limitations of claim 22. Accordingly, for at least the same reasons as those set forth above in connection with claim 22, it is respectfully submitted that claim 24 is patentable over the prior art.

IV. The Prior Art Rejection of Claims 3-6, 21 and 23 Should be Withdrawn

In the Office Action dated May 5, 2004, the Examiner rejected claims 3-6, 21 and 23 under 35 U.S.C. Section 103(a) as allegedly being unpatentable over Notman.

A. Claims 3-6

Claims 3-6 all depend from and incorporate all the limitations of claim 1. Claims 3-6 further contain limitations directed to additional partitions in the enclosure. The Examiner alleged that the additional partitions would have been an obvious modification of Notman. Regardless, Notman modified as proposed by the Examiner still does *not* include a gas connector having a gas port in fluid communication with a passageway of the gas connector that is upstream of the gas connector outlet and downstream of the gas connector inlet, as recited in claim 1. Accordingly, claims 3-6 are patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

B. Claim 21

As an initial matter, claim 21 depends (indirectly) from and incorporates all the limitations of claim 1. Accordingly, for reasons independent of those set forth above in connection with claim 1, it is respectfully submitted that the rejection of claim 21 is in error and should be reversed.

C. Claim 23

1. Claim 23 depends from Claim 22

As an initial matter, claim 23 depends from and incorporates all the limitations of claim 22. Accordingly, claim 23 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 22.

2. Additional Limitations of Claims 23

Claims 23 also recites the following limitations:

the gas port is disposed between the inlet and the outlet of the passageway

Accordingly, claim 23 adds a limitation similar to that discussed above in connection with claim 1.

As discussed above, Notman does not disclose a gas port disposed between the inlet and the outlet of the passageway of the gas connector. Again, the Examiner asserts that it would have been *obvious* to “optimize the dimension (height) of Notman’s gas connector passageway such that his gas port is disposed between the inlet and outlet of his passage way . . . to provide for longer residence time for the flowing gasses.” (5/5/04 Office Action, page 6).

Again, the motivation cited by the Examiner for such a modification is allegedly to “provide for longer residence time for the flowing gasses.” As discussed above in connection with claim 21, Notman does not disclose any necessity or desirability for “provid[ing] for longer residence time for the flowing gasses”. As a consequence, the Examiner has not provided a legally sufficient motivation or suggestion to modify Notman.

In addition, the Examiner proposed that optimizing the height of the gas connector would somehow result in the gas port being disposed between the inlet and the outlet of the gas connector passageway. The Examiner’s proposition that optimizing the height of the gas connector would result in the repositioning of the gas port in a manner consistent with claim 1 is merely speculative. Even if there were a motivation to change the height of the heat exchanger 40 (the alleged gas connector), that could be accomplished in any number of ways without the sparger 30 being located between the main feed 34 and the feed holes 32 of Notman.

For all of the above reasons, it is respectfully submitted that the obviousness rejection of claim 23 should be reversed for reasons independent of those set forth above in connection with claim 21.

V. The Prior Art Rejection of Claims 7 and 11 Should be Withdrawn

In the Office Action dated May 5, 2004, the Examiner rejected claims 7 and 11 under 35 U.S.C. Section 103(a) as allegedly being unpatentable over Mundt in view of Notman.

A. Mundt

Mundt teaches an apparatus and method for eliminating unwanted materials from an effluent gas flow line. Mundt teaches a reactive trap connected to the effluent gas flow line wherein chemical reaction between the unwanted material, a reactant gas and a reactive element takes place under induced plasma conditions. A ballast gas may be added to adjust operating pressures and to aid in creating the plasma.

B. The Examiner's Rejection of Claim 7

Claim 7 depends from and incorporates all the limitations of claim 1. While the rejection of claim 7 is over Mundt in view of Notman, Mundt does not overcome the deficiencies of Notman with respect to claim 1, as discussed above. Accordingly, claim 7 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

C. The Examiner's Rejection of Claim 11

Claim 11 depends from and incorporates all the limitations of claim 1. While the rejection of claim 11 is over Mundt in view of Notman, Mundt does not overcome the deficiencies of Notman with respect to claim 1, discussed above. Accordingly, claim 11 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

VI. The Prior Art Rejection of Claim 9 Should be Withdrawn

In the Office Action dated May 5, 2004, the Examiner rejected claim 9 under 35 U.S.C. Section 103(a) as allegedly being unpatentable over Notman in view of McGinness.

A. McGinness

McGinness teaches an apparatus and method for initiating and sustaining an oxidation reaction. A fuel, such as natural gas or hazardous waste, is introduced into a reaction zone within a pressurized containment vessel. A permeable liner is placed within the containment vessel and around the reaction zone. An oxidizer is mixed with a carrier fluid and the mixture is heated and pressurized to supercritical conditions of temperature and pressure.

B. Claim 9

Claim 9 stands rejected as allegedly being obvious over Notman in view of McGinness. Claim 9 depends from and incorporates all the limitations of claim 8. Claim

9 further contains limitations directed to an electrical heating element. The Examiner alleged that the electrical heating element, which is allegedly disclosed in McGinness, would have been an obvious modification of Notman. Regardless, Notman modified as proposed by the Examiner still does *not* include a gas connector having a gas port that is upstream of the gas connector outlet and downstream of the gas connector inlet, as called for in claim 1. Accordingly, claim 9 is patentable over the prior art for at least the same reasons as those set forth above in connection with claim 1.

VII. The Prior Art Rejection of Claims 12-14 Should be Withdrawn

In the Office Action dated May 5, 2004, the Examiner rejected claims 12-14 under 35 U.S.C. Section 103(a) as allegedly being unpatentable over Mundt, Notman and McGinness.

Claims 12-14 stand rejected over Mundt in view of Notman in further view of McGinness. Claims 12-14 all depend from and incorporate all of the limitations of claim 11. As discussed above, there is no legally sufficient motivation or suggestion to combine Mundt and Notman as proposed by the Examiner. McGinness does not supply the missing motivation or suggestion. Accordingly, for at least the same reasons as those set forth above in connection with claim 11, it is respectfully submitted that claims 12-14 are patentable over the prior art.

IX. Conclusion

For all of the foregoing reasons, claims 1-14 and 21-24 are not unpatentable under 35 U.S.C. § 103(a). As a consequence, Applicants respectfully request withdrawal of all

rejections to the claim, reconsideration, an early allowance thereof.

Respectfully submitted,

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